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| SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION <i>Large Coating, Printing and Chemical Operations Team</i> APPLICATION PROCESSING AND CALCULATIONS | PAGE 1 of 11 APP. NUMBERS 505300/1/2 PROCESSED BY SMP REVIEWED BY DATE 02/14/10 |
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**PERMIT TO CONSTRUCT
FLOWCOATER, OVEN & RTO**

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|------------------------------|--------------------------------------|
| Applicant's Name | ANTHONY, INC. |
| Company I.D. | 118314 |
| Mailing Address | 12812 ARROYO, SAN FERNANDO, CA 91342 |
| Equipment Address | 12812 ARROYO, SAN FERNANDO, CA 91342 |
| Equipment Description | |

Application No.: 505302 (New Construction)

FLOWCOATER, KOATING MACHINERY, 3' – 6" W. X 0' – 6" L. X 1' – 0" H. WITH A 1.5 H.P. PUMP. (D41)

Application No.: 505301 (New Construction)

OVEN, THERMATROL, MODEL NO. EC-72SS-COOLER, 11' - 0" L. X 6 - 2" W. X 7' - 0" H., ELECTRICALLY HEATED, 48.6 KW. (D42)

Application No.: 505300 (New Construction) (C43)

AIR POLLUTION CONTROL SYSTEM CONSISTING OF:

1. REGENERATIVE THERMAL OXIDIZER, ADWEST TECHNOLOGIES INC., MODEL NO. 2.0 RTO95, 2,000 CFM, 11' – 2" L. X 8' – 6" W X 7' – 4" H, DUAL CHAMBER CERAMIC MEDIA, WITH A 578,000 BTU/HR MAXON NATURAL GAS-FIRED BURNER, MODEL 1.5 KINEDIZER-LE, A 3.0 H.P. COMBUSTION BLOWER, AND A NATURAL GAS INJECTION SYSTEM UP TO 99,000 BTU/HR.
2. EXHAUST SYSTEM WITH A 12.3 H. P. FAN @ 2000 CFM, VENTING ONE FLOWCOATER AND ONE OVEN.

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Application No.: 506321

TITLE V PERMIT REVISION.

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| HISTORY |
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Anthony, Inc. submitted the above permit applications (class I) for permits to construct a new flowcoater, an oven and a new regenerative thermal oxidizer (RTO).

Anthony, Inc. manufactures insulated glass units for commercial freezer and refrigerator doors. The facility has active permits from the District for a spray booth, spray enclosure, RTO, a baghouse, and ovens under ID. No. 118314. In the manufacturing process, the glass panels are coated with a conductive clearcoat, so that the surface of the glass doors could be heated to avoid condensation. The company was purchasing a special glass with antifog coating from a sub-contractor. The sub-contractor has decided to cease this operation. Hence, Anthony, Inc. has purchased the above equipment and applied for permits to construct them at their Sylmar facility.

Only VOC emissions are expected from the flowcoater. A facility-wide VOC limit of 150 lbs/day has been established for Anthony, Inc. The company requested no emission increases from this project. All other criteria pollutant emissions from the natural gas combustions are expected to be less than 0.5 lbs/day. Hence, no offsets will be required for this project.

The manufacturer has guaranteed in the past NO_x emissions to be less than 30 ppm at 3% oxygen level from the RTO burner (Kinedizer LE). Thus, it will comply with the current BACT requirements. The oven will also comply with the current BACT requirements, as it will be powered by electricity.

The District database shows one notice of violation issued to this facility for failure to submit annual compliance certification and semi-annual monitoring reports on time and operating and installing an ICE without permit. Since then, the inspector has disposed the notice of violation as "in compliance", as the company had submitted necessary reports and the ICE have been disconnected. The database also shows one notice to comply was issued to the facility to store baghouse discharge in closed container, provide VOC emission reports and to replace the spray booth filters. Since then the inspector has disposed the notice of violation as "in compliance". The facility has not received any complaints for the public nuisance or visible emissions.

This facility is not located within 1000 feet from any school and there will not be any emission increases from this project above the R212(g) subparagraph limits, hence, these applications will not require a public notice.

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Anthony Inc. is a Title V facility. A Title V renewal permit was issued to this facility on May 9, 2005. The proposed permit revision is considered as a “de minimis significant permit revision” to the renewed Title V permit, as described in Regulation XXX evaluation.

PROCESS DESCRIPTION

Anthony, Inc. fabricates refrigeration glass door assemblies. The glass panels are coated with different special coatings as per their end use. One of such coating line will be antifog coating line containing flowcoater, oven and RTO, as described above.

The facility already has a permitted coating line, which has been permitted for many years, where the glass is initially heated in a furnace to a softening point (1100⁰ F to 1300⁰ F). The glass is then conveyed to the spray booth where a hydrofluosilicic acid solution (prespray solution) is sprayed automatically on to the hot glass to improve the stability of the subsequent coating. Next, a tin solution is automatically sprayed with a mixture of stannic chloride, methanol, and hydrochloric or hydrofluoric acid. These mixtures vary depending on the customer and the heating voltage requirements/specifications. This coating pyrolyzes (thermally decomposes) upon contact with the hot glass to form a tin oxide layer on the glass surface. The overspray is drawn into a duct and injected with ammonia and lime, which neutralizes the excess stannous chloride to stannous oxide and ammonium chloride, which are collected in a baghouse. The ammonia also maintains the pH level of the exhaust.

The applicant recently obtained permits to construct a long, conveyORIZED, electrically heated furnace and coating application line, which will be vented to a new RTO unit. The furnace will have two heating sections, operating at a temperature of about 1100⁰ to 1300⁰ F. A 3-foot coating section will be located between these two sections. It will have a removable stainless steel exhaust hood and heated to above 1100⁰ F by the heat from the two sections. During the coating application operation, a coating enclosure will be inserted in the middle of the furnace. A spray reciprocator (with spray nozzles) will enter the coating enclosure a couple of seconds before the glass entry and apply a tin-based coating. The spray reciprocator will come out of the enclosure after the glass panel is coated to avoid damage from the high temperature. The spray hopper, the spray enclosure, and the whole furnace (which acts as an oven during the coating application) will be vented to the RTO.

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The applicant has applied for a new conveyORIZED coating line. The line will have a glass washer, a flowcoater and a dryer/oven. The oven will be directly vented to a RTO unit to control the VOC emissions. The coating enclosure is directly connected to the oven. Thus, both flowcoater and the oven are vented to the RTO. The negative pressure in the oven will have 100% VOC collection efficiency. The customized new glass coating with alcohols and polymers will have a maximum VOC content of 6.36 pounds per gallon. Generally only one coating will be applied in this equipment, hence clean-up material will be used only once in a while on this equipment. The emissions from the clean-up solvents will also be vented to the RTO unit.

The RTO is capable of processing 2,000 CFM of contaminated air from the flowcoater and the drying/curing oven. The RTO is initially heated to 1500⁰ F by a startup burner, which supplies heat to the ceramic media. This media is located in two process zones. The hot exhaust air goes to the other process bed to transfer the heat to the other ceramic bed. The thermal energy recovery is 95%. The contaminated air switches every two minutes between the two ceramic beds. If the VOC in the contaminated stream is not sufficient to sustain the temperature, then natural gas is injected into the RTO. This equipment is expected to meet the VOC BACT requirements by achieving a minimum 90% collection efficiency and at least 95% destruction efficiency; overall VOC control efficiency of 95%. A source test will be conducted to verify the collection, destruction and control efficiencies.

The afterburner unit being a "Regenerative Thermal Oxidizer – RTO" with a 0.578 mm BTU/HR burner will use a burner with less than 30 ppmv NO_x at 3% O₂. This will comply with the current NO_x BACT requirements for a RTO. The coating operation will be subject to Rules 1145 and 1171. With the RTO, the applicant will comply with the current BACT and rule requirements for VOC.

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| OPERATING HOURS |
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Average: 8 hr/day, 2 day/week, 52 weeks/year
Maximum: 12 hr/day, 5 day/week, 52 weeks/year

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OXIDIZER DESIGN

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|--|----------------------|
| Total maximum contaminated process flow rate: | 2000 cfm |
| Inlet operating temperature | 70 ⁰ F |
| Outlet operating temperature from combustion chamber | 1500 ⁰ F |
| Heat exchanger efficiency: | 95% |
| Heat Input Rating of the burner for initial heating of the media | 0.578 mm BTU/HR |
| Volume of the combustion zone | 55.4 ft ³ |

Heat required to heat air from 70 °F to 1600 °F(worst case)

$$M = 2000 \text{ scfm} \times 0.075 \text{ lb/scf} \times 60 \text{ min/hr} = 9,000 \text{ lb/hr}$$

$$Cp_{70} = 0.240 \text{ Btu/lb } ^\circ\text{F} \quad Cp_{1500} = 0.275 \text{ Btu/lb } ^\circ\text{F}$$

$$Cp_{avg} = 0.258 \text{ Btu/lb } ^\circ\text{F}$$

$$Q = MCp \Delta T = 9000 \times 0.258 \times (1600 - 70) = 3.55 \text{ MM Btu/hr}$$

$$\text{After 95\% heat recovery, } Q = 3.55 \times 0.05 = 0.178 \text{ MM Btu/hr}$$

$$\text{Heat input needed: } 0.178 \times 1050/615 = 0.3 \text{ mm BTU/HR. (Table D7, Page 948, AP 40.)}$$

The applicant will use the burner to start-up the RTO only. The natural gas injection and the VOCs will maintain the temperature in the combustion chamber. The RTO will have a burner rated at 0.578×10^6 Btu/hr for start-up, which is sufficient to heat the RTO to operating temperature. A permit condition will require a source test upon completion of the installation. A permit condition will also limit the use of the burner for start-up operation only.

Residence time calculation

$$\text{Flow rate per minute} = 2000 \text{ cfm} / 60 \text{ sec/min} = 33.3 \text{ cfs}$$

$$\text{Corrected volume} = 33.3 \text{ cfs} \times 1960/530 = 123 \text{ cfs (1500 } ^\circ\text{F to 70 } ^\circ\text{F)}$$

$$\text{Combustion zone volume} = 55.4 \text{ cubic feet}$$

$$\text{Residence time} = 55.4 / 123 = 0.45 \text{ sec (greater than 0.3 sec – compliance)}$$

EMISSION CALCULATIONS

Application No. 505300 (RTO)

It will take one hour maximum to get the ceramic bed up to temperature (1500°F).

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A/N 505300

Adwest RTO

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| | maximum | normal | | |
|--------------|---------|--------|----------------------------|-------------------|
| hr/dy | 24 | 1 | max heat input | 5.78E+05 (BTU/hr) |
| <u>dy/wk</u> | 7 | 7 | <u>gross heating value</u> | 1050 (BTU/scf) |
| <u>wk/yr</u> | 52 | 52 | | |
| <u>load</u> | 100% | 100% | | |

| | Emission Factors | MAX (lb/hr) | AVE (lb/hr) | MAX (lb/dy) | 30-DAY (lb/dy) | MAX (lb/yr) | MAX (ton/yr) |
|------------------------------|---------------------|----------------|----------------|----------------|-------------------|----------------|-----------------|
| SO ₂ (R1) | 0.6 | 0.000 | 0.000 | 0.008 | NA | 3 | 0.001 |
| SO ₂ (R2) | 0.6 | 0.000 | 0.000 | 0.008 | 0.008 | 3 | 0.001 |
| NO ₂ (R1) | 37.8 | 0.021 | 0.021 | 0.499 | NA | 182 | 0.091 |
| NO ₂ (R2) | 37.8 | 0.021 | 0.021 | 0.499 | 0.499 | 182 | 0.091 |
| CO (R1) | 37.75 | 0.021 | 0.021 | 0.499 | NA | 182 | 0.091 |
| CO (R2) | 37.75 | 0.021 | 0.021 | 0.499 | 0.499 | 182 | 0.091 |
| TOC (R1=R2) | 7 | 0.004 | 0.004 | 0.092 | NA | 34 | 0.017 |
| N ₂ O (R1=R2) | 2.2 | 0.001 | 0.001 | 0.029 | 0.029 | 11 | 0.005 |
| PM, PM ₁₀ (R1=R2) | 7.5 | 0.004 | 0.004 | 0.099 | 0.099 | 36 | 0.018 |
| Hexane | 0.0063 | 3.5E-06 | 3.5E-06 | 8.3E-05 | NA | 3.03E-2 | 1.51E-5 |
| Ammonia | 3.2 | 1.8E-03 | 1.8E-03 | 4.2E-02 | NA | 1.54E+1 | 7.69E-3 |
| ethyl benzene | 0.0095 | 5.2E-06 | 5.2E-06 | 1.3E-04 | NA | 4.57E-2 | 2.28E-5 |
| acetaldehyde | 0.0043 | 2.4E-06 | 2.4E-06 | 5.7E-05 | NA | 2.07E-2 | 1.03E-5 |
| acrolein | 0.0027 | 1.5E-06 | 1.5E-06 | 3.6E-05 | NA | 1.30E-2 | 6.49E-6 |
| benzene | 0.008 | 4.4E-06 | 4.4E-06 | 1.1E-04 | NA | 3.85E-2 | 1.92E-5 |
| formaldehyde | 0.017 | 9.4E-06 | 9.4E-06 | 2.2E-04 | NA | 8.18E-2 | 4.09E-5 |
| napthalene | 0.0003 | 1.7E-07 | 1.7E-07 | 4.0E-06 | NA | 1.44E-3 | 7.21E-7 |
| PAH's | 0.0001 | 5.5E-08 | 5.5E-08 | 1.3E-06 | NA | 4.81E-4 | 2.40E-7 |
| toluene | 0.0366 | 2.0E-05 | 2.0E-05 | 4.8E-04 | NA | 1.76E-1 | 8.80E-5 |
| xylene | 0.0272 | 1.5E-05 | 1.5E-05 | 3.6E-04 | NA | 1.31E-1 | 6.54E-5 |

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|---|-------|--------|---|---------|--------------------------|
| NO ₂ @ 3% excess O ₂ ----->>> | 29.12 | (ppmv) | SO ₂ @ 3% excess O ₂ ----->>> | 0.33 | (ppmv) |
| CO @ 3% excess O ₂ ----->>> | 47.77 | (ppmv) | PM @ 12% CO ₂ ----->>> | 5.5E-09 | (grain/ft ³) |

Ver. 1.3

Total NOx Emissions.

The manufacturer guaranteed NOx emissions to be less than 30 ppm at 3% oxygen level from the burner. There will be additional process NOx emissions from this operation. NOx emissions of 2 ppm maximum from the oxidation of the contaminated air inflow is expected from this operation. The NOx lbs/hr is calculated as follows.

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$$\begin{aligned}
 \text{Lbs/hr} &= \text{PPM} \times \text{MW} \times 60 \times \text{SCF} / 379 \times 10^6 \\
 &= 2 \times 46 \times 60 \times 2,000 / 379 \times 1000000 \\
 &= 0.03
 \end{aligned}$$

In a day maximum 1.0 hrs will be for the start-up burner operation with 0.021 lb NOx emission. Hence, 24 – 1 = 23 hrs for the process NOx emissions @ 0.03 lb/hr.

Total NOx emission in a day = [0.03 x 23] + 0.021 = 0.71 lbs/day. (0.03 lbs/hr)

Toxic Compound Emissions and Risk Assessment

A Tier 2 Risk Assessment was performed to determine the health risk from the toxic air contaminants emitted from the RTO due to combustion of natural gas. The assessment calculated a cancer risk of 0.0113 in a million (1.13E-08) for the residential receptor and 0.00416 in a million (4.16E-09) for a commercial receptor. The assessment also calculated both acute and chronic hazard index risks and all the risks were below 1. Thus, the Tier 2 risk assessment demonstrated compliance with the Rule 1401 requirements.

Application No. 505301 and 505302 (Flowcoater and Oven)

Only VOC emissions are expected from this equipment. All the emissions will be assigned to A/N 505302 (Flowcoater). The oven being electrically heated there will not be any combustion emissions.

Coating Related VOC Emissions

The primary coating, which is mixed on site, will have dibutyltin oxide, ammonium acetate, hydrofluoric acid, ethyl alcohol, and IPA. The maximum solid content will be 11.3% by weight. and maximum VOC content will be 6.61 lbs/gal. The applicant will apply a maximum of approximately 17.5 gal/day of this coating and average being 10 gal/day.

Average:

10 gallon @ 6.61 lb-VOC/gal

$$\begin{aligned}
 \text{Uncontrolled (R}_1\text{)} &= 10.0 \times 6.61 = 66.1 \text{ lb-VOC/day (8.26 lb/hr)} \\
 \text{Controlled (R}_2\text{)} &= 66.1 \times (1 - 0.95) = 3.3 \text{ lb-VOC/day (0.41 lb/hr)}
 \end{aligned}$$

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Maximum:

17.5 gallon @ 6.61lb-VOC/gal

Uncontrolled (R_1) = $17.5 \times 6.61 = 115.68$ lb-VOC/day (9.64 lb/hr)

Controlled (R_2) = $115.68 \times (1 - 0.95) = 5.78$ lb-VOCday (0.48 lb/hr)

Toxic Emissions from the Coating Usage:

The coating contains a small quantity of xylene, a Rule 1401 toxic compound. It is 2% by weight (i.e. 0.16 lbs/gal) At maximum usage @ 17.5 gal/day, there will be 2.8 lbs/day emission. At 24 hrs/day that will be 0.12 lbs/hr and 1022 lbs/year xylene emissions. These emissions are well below Tier 1 screening levels (11 lbs/hr, 23,100 lbs/year) of xylene at 25 meter receptor. Thus, it is expected to comply with the Rule 1401 requirements.

Coating Related PM Emissions

There are no particulate emissions associated with the coating usage; this is a flowcoater unit.

RULES/REGULATION EVALUATION

□RULE 212, PUBLIC NOTIFICATION

√SECTION 212(c)(1):

This section requires a public notice for all new or modified permit units that may emit air contaminants located within 1,000 feet from the outer boundary of a school. This source is not located within 1,000 feet from the outer boundary of a school. Therefore, public notice will not be required by this section.

√ SECTION 212(c)(2):

This section requires a public notice for all new or modified facilities which have on-site emission increases exceeding any of the daily maximums as specified in subdivision (g). As shown in the following table, the emission increases from this facility are below the daily maximum limits specified by Rule 212(g). Therefore, these applications will not be subject to this section.

| LB/DAY | CO | NOX | PM10 | ROG | Lead | SOX |
|------------|-----|-----|------|-----|------|-----|
| MAX. LIMIT | 220 | 40 | 30 | 30 | 3 | 60 |
| INCREASES | 0 | 1 | 0 | 0 | 0 | 0 |

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✓ **SECTION 212(c)(3):**

Please, see Rule 1401 evaluation section.

✓

SECTION 212(g):

This section requires a public notice for all new or modified sources which undergo construction or modifications resulting an emissions increase exceeding any of the daily maximum specified in the table below. As shown in the following table, the emission increases from this project are below the daily maximum limits specified by Rule 212(g). Therefore, public notice will not be required by this section.

| LB/DAY | CO | NOX | PM₁₀ | ROG | Lead | SOX |
|-------------------|-----------|------------|------------------------|------------|-------------|------------|
| MAX. LIMIT | 220 | 40 | 30 | 30 | 3 | 60 |
| INCREASES | 0 | 1 | 0 | 5.78 | 0 | 0 |

□ **RULES 401 & 402, VISIBLE EMISSIONS & NUISANCE**

AQMD database has no records of any visible emissions or nuisance violations against this company, except as already noted in the background.

□ **RULE 1145, PLASTIC, RUBBER, LEATHER AND GLASS COATINGS**

(c)(1) VOC CONTENT

The applicant will be in compliance with these requirements by using an air pollution control equipment with a sufficient VOC control efficiency (100% collection and 95% destruction).

□ **RULE 1145, PLASTIC, RUBBER, LEATHER AND GLASS COATINGS**

(c)(4) TRANSFER EFFICIENCY

The applicant will be in compliance with these requirements by using an air pollution control equipment with a sufficient VOC control efficiency (100% collection and 95% destruction).

□ **RULE 1171, SOLVENT CLEANING OPERATIONS**

The applicant will be in compliance with these requirements by using an air pollution control equipment with a sufficient VOC control efficiency (100% collection and 95% destruction).

REGULATION XIII

□ **RULE 1303(a), BEST AVAILABLE CONTROL TECHNOLOGY (BACT)**

(a) VOC EMISSIONS

VOC emissions from the flowcoater and oven are vented to an air pollution control system consisting of a RTO with a sufficient VOC control efficiency (100% collection and 95% destruction). This will comply with the provisions of the current BACT requirements.

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(a) NO_x EMISSIONS

The RTO burner is used for start-up operation only. Thus, NO_x emissions are guaranteed to be <30 ppmv at 3% O₂. This will comply with the provisions of the current BACT requirements. The oven is electric.

(a) PM₁₀ EMISSIONS

PM₁₀ emissions are less than 1 lb/day. BACT is not triggered.

▣ **RULE 1303(b)(1), MODELING**

Detailed modeling analysis is not required for <0.2 lb/hr NO_x, <11.0 lb/hr CO and <1.2 lb/hr PM₁₀ lb/hr emissions.

▣ **RULE 1303 (b)(2), EMISSION OFFSETS**

The combustion and VOC emissions are within the threshold limits. Thus, no emission offsets are required.

▣ **RULE 1401, NEW SOURCE REVIEW OF CARCINOGENIC AIR CONTAMINANTS**

As discussed in this evaluation report, this equipment is expected to comply with the rule requirements.

REGULATION XXX

This facility is not in the RECLAIM program. The proposed project is considered as a “de minimis significant permit revision” to the Title V permit for this facility.

Rule 3000(b)(6) defines a “de minimis significant permit revision” as any Title V permit revision where the cumulative emission increases of non-RECLAIM pollutants or hazardous air pollutants (HAPs) from these permit revisions during the term of the permit are not greater than any of the following emission threshold levels:

| AIR CONTAMINANT | Daily Maximum (lbs/day) |
|------------------------|--------------------------------|
| HAP | 30 |
| VOC | 30 |
| NO _x * | 40 |
| PM ₁₀ | 30 |
| SO _x * | 60 |
| CO | 220 |

* Not applicable if this is a RECLAIM pollutant

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To determine if a project is considered as a “de minimis significant permit revision” for non-RECLAIM pollutants or HAPs, emission increases for non-RECLAIM pollutants or HAPs resulting from all permit revisions that are made after the issuance of the Title V renewal permit shall be accumulated and compared to the above threshold levels. This proposed project is the 3rd permit revision to the Title V renewal permit issued to this facility on May 9, 2005. The following table summarizes the cumulative emission increases resulting from all permit revisions since the Title V renewal permit was issued:

| Revision | HAP | VOC | NO_x | PM₁₀ | SO_x | CO |
|--|------------|------------|-----------------------|------------------------|-----------------------|------------|
| 1 st Permit Revision, to add abrasive blasting unit (D33), modify baghouse (C5), add two mixers (D36 and D37), and modify oven (D11). | 0 | 0 | 0 | 1 | 0 | 0 |
| 2 ND revision to add spray enclosure (D40), oven (D39), and RTO (C38) | 1 | 1 | 17 | 1 | 0 | 1 |
| 3 rd revision to add rollercoater (D41), oven (D42), and RTO (C43) | 0 | 0 | 1 | 0 | 0 | 0 |
| <i>Maximum Daily</i> | <i>1</i> | <i>1</i> | <i>18</i> | <i>2</i> | <i>0</i> | <i>1</i> |
| <i>Maximum Daily</i> | <i>30</i> | <i>30</i> | <i>40</i> | <i>30</i> | <i>60</i> | <i>220</i> |

Since the cumulative emission increases resulting from all permit revisions are not greater than any of the emission threshold levels, this proposed project is considered as a “de minimis significant permit revision”.

RECOMMENDATION

The proposed project is expected to comply with all applicable District Rules and Regulations. Since the proposed project is considered as a “de minimis significant permit revision”, it is exempt from the public participation requirements under Rule 3006 (b). A proposed permit incorporating this permit revision will be submitted to EPA for a 45-day review pursuant to Rule 3003(j). If EPA does not have any objections within the review period, a revised Title V permit will be issued to this facility.